SECTION 16410

SAFETY SWITCHES AND ENCLOSED CIRCUIT BREAKERS

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LANL MASTER CONSTRUCTION SPECIFICATION

When editing to suit Project, author shall add job-specific requirements and delete only those portions that do not apply to the Project (e.g., a component that does not apply). To seek a variance from applicable requirements, contact the Engineering Standards Manual (ESM) Electrical POC. Refer to http://engstandards.lanl.gov/engrman/HTML/poc_techcom1.htm#elec for the Engineering Standards Manual Personnel Link Index.

When assembling a specification package, include applicable specifications from all Divisions, especially Division 1, General Requirements.

Delete information within "stars" during editing.

Specification developed for ML-3 / ML-4 projects. For ML-1 / ML-2, additional requirements and QA reviews are required.

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PART 1 GENERAL

1.1 SECTION INCLUDES

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Edit the following articles to match project requirements.

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A. Safety switches

B. Enclosed circuit breakers

1.2 SUBMITTALS

A. Submit the following in accordance with Section 01330, *Submittal Procedures*:

1. Product Data: Submit manufacturer's technical data for each type of safety switch and enclosed circuit breaker, including data proving that materials comply with specified requirements. Provide catalog sheets showing voltage, current ratings, short circuit ratings, dimensions, and enclosure details.

2. Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.3 QUALITY ASSURANCE

A. Comply with the *National Electrical Code* (NEC) for components and installation.

B. Provide safety switches and circuit breakers that are listed and labeled by a Nationally Recognized Testing Laboratory (NRTL) for the application, installation condition, and the environment in which installed.

C. Comply with the following standards as applicable:

1. NEMA AB 1 (UL 489) *Molded Case Circuit Breakers, Molded Case Switches, and Circuit Breaker Enclosures*

2. NEMA FU 1 - *Low Voltage Cartridge Fuses*

3. NEMA KS 1 - *Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum)*

4. UL 50 - *Enclosures for Electrical Equipment.*

1.4 RECEIVING, STORING AND PROTECTING

A. Receive, inspect, handle, and store safety switches and enclosed circuit breakers according to the manufacturer's written instructions and NECA 1 *Standard Practices for Good Workmanship in Electrical Construction* (ANSI).

1.5 EXTRA MATERIALS

A. Provide one spray can of touch-up paint that matches finish of switches and enclosed circuit breakers finish.

B. Provide a spare set of three fuses of each type and size installed in fused safety switches.

PART 2 PRODUCTS

2.1 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Alternate products may be accepted; follow Section 01630, *Product Options and Substitutions.*

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Edit the following article to match project requirements. Delete if safety switches are not required for the Project

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2.2 SAFETY SWITCHES

A. Provide NRTL-listed, NEMA KS 1 Type HD safety switches with ratings and number of poles as indicated on the Drawings or as required by the NEC.

B. Provide safety switches for use as service equipment that are NRTL labeled for the application.

C. Provide enclosure type in accordance with NEMA KS 1 as required by the conditions of installation and use.

D. For fusible safety switches provide rejection clips designed to accommodate NEMA FU 1, Class R fuses. Provide fuse pullers in 30, 60, and 100 ampere fusible safety switches.

E. Furnish each safety switch with an equipment ground bar.

F. Furnish a neutral bar for each safety switch used on a circuit that includes a grounded “neutral” conductor.

G. Provide safety switches rated 100 amperes and larger that a suitable for use with crimp-on compression lugs.

H. Provide auxiliary electrical interlock switches with safety switches as indicated on the Drawings or as required by the application.

I. Manufacturer: Square D “Class 3110”.

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Edit the following article to match project requirements. Delete if fused safety switches are not required for the Project

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2.3 FUSES

A. Provide NRTL-listed, NEMA FU 1 Class R fuses for fusible safety switches as indicated on the Drawings, required by the NEC, or required by the manufacturer of served equipment.

B. Size fuses in accordance with NEC requirements based upon load supplied.

C. Provide a cabinet for spare fuses.

D. Manufacturer: Bussman “LPN-RK_SP” (250 V), “LPS-RK_SP” (600 V), and “SFC-FUSE-CAB”

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Edit the following articles to match project requirements. Delete if enclosed circuit breakers are not required for the Project

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2.4 ENCLOSED CIRCUIT BREAKERS

A. Provide NRTL-listed, NEMA AB 1 enclosed molded-case circuit breakers with ratings and number of poles as indicated on the Drawings or as required by the NEC.

B. Provide enclosed circuit breakers suitable for use at an elevation of 7500 ft.

C. Provide 600-volt multi-pole circuit breakers for use on 480-volt or 480Y/277-volt systems.

D. Provide enclosed circuit breakers for use as service equipment that are NRTL labeled for the application.

E. Provide enclosure type in accordance with UL-50 as required by the conditions of installation and use.

F. Furnish each enclosed circuit breaker with an equipment ground bar.

G. Furnish a neutral bar for each enclosed circuit breaker used on a circuit that includes a grounded “neutral” conductor.

H. Provide enclosed circuit breakers rated 100 amperes and larger that are suitable for use with crimp-on compression lugs.

I. [Provide enclosed circuit breakers with the following accessories as indicated on the Drawings or as required by the application.]

1. [Auxiliary electrical interlock switch]

2. [Alarm switch]

3. [Shunt trip]

J. Manufacturer: Square D “Class 610” enclosure with F, K, L, or M frame circuit breaker.

PART 3 EXECUTION

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Delete this article when existing construction is not affected.
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3.1 EXISTING WORK

A. Disconnect and remove each abandoned safety switch and enclosed circuit breaker.

B. Maintain access to each existing safety switch and enclosed circuit breaker that is to remain active.

C. Clean, repair, and test existing safety switches and enclosed circuit breakers to remain or be reinstalled for the project per the Field Quality Control paragraphs of this Section.

3.2 EXAMINATION

A. Examine surfaces to receive safety switches and enclosed circuit breakers for compliance with installation tolerances and other conditions affecting performance of the product. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Install safety switches and enclosed circuit breakers where indicated on the Drawings and according to manufacturer's instructions, NECA 1, and the *NEC*. Have the manufacturer’s installation instructions available at the construction site.

B. Install each safety switch and enclosed circuit breaker so the interlock bypass will be accessible.

C. Provide supports and seismic anchorage in accordance with the manufacturer’s installation instructions and Section 16070 *Hangers, Supports, and Seismic Protection.*

D. Ground and bond safety switches and enclosed circuit breakers as required in Section 16060 *Grounding and Bonding*.

E. Install conduits as required in Section 16130 *Raceways and Boxes*.

F. Install conductors as required in Section 16120 *Building Wire and Cable*.

1. Use compression type lugs to connect all service, feeder, and branch circuit cables greater than 100 amperes.

2. Tighten electrical connectors and terminals to the manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A.

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Edit the following articles to match project requirements. Delete if fused safety switches are not required for the Project

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G. Install fuses in fusible safety switches as indicated on the Drawings or as required to match installed motor or load characteristics. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.

H. Install spare fuse cabinet in the main electrical room.

3.4 IDENTIFICATION

A. Identify safety switches and enclosed circuit breakers and install warning signs and arc-flash warning labels as required in Section 16075 *Electrical Identification*.

B. Provide permanent indication of trip rating of each enclosed circuit breaker or fuses installed in each enclosed switch that will be visible without opening cover and exposing energized conductors.

C. Mark floor in front of safety switches and enclosed circuit breakers to show *NEC* required working space according to Section 16075 *Electrical Identification*.

3.5 FIELD QUALITY CONTROL

A. Clean interior and exterior of safety switches and enclosed circuit breakers.

B. Verify that ratings for safety switches and enclosed circuit breakers match values indicated on the Drawings.

C. Verify proper torque of accessible bus connections and mechanical fasteners after installing safety switches and enclosed circuit breakers.

D. After completing installation, cleaning, and testing, touch up scratches and mars on finish to match original finish.

E. Perform acceptance inspection and tests as required in Section 16080 *Electrical Acceptance Testing*.

END OF SECTION

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Do not delete the following reference information.

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This project specification is based on LANL Master Construction Specification Rev. 0, dated January 20, 2005.